REMARKS

With this amendment, Claim 2 is canceled, Claims 1 and 3-4 are amended, and Claim 9 has been added. Claims 1, and 3-9 are thus presented for further Examination.

The specific changes to the specification and the amended claims are shown on a separate set of pages attached hereto and entitled VERSION WITH MARKINGS TO SHOW CHANGES MADE, which follows the signature page of this Amendment. On this set of pages, the insertions are underlined while the ~~deletions are stricken through~~.

Objection to the Specification

The Examiner has objected to the abstract. The abstract has been amended in accordance with the examiners instructions.

Rejections Under 35 U.S.C. § 103

The Examiner has rejected Claim 1 under 35 U.S.C. § 103(a) as unpatentable over Nakajima et al., JP 10-010380 in view of Konaka et al., JP 63-213809. The Examiner has rejected Claims 2-8 under 35 U.S.C. § 103(a) as unpatentable over Nakajima et al. in view of Konaka et al. and further in view of U.S. Patent No. 5,034,056 to von Bonin. The Examiner has also rejected Claim 1 under 35 U.S.C. § 103(a) as unpatentable over Nakajima et al., JP 09-120023 in view of Konaka et al., JP 63-213809.

Claim 1 has been amended to include the limitations of Claim 2, and Claim 2 has been cancelled. Claim 4 has been amended to be in independent form.

In the preferred embodiments of the present invention, a coating layer is formed by a non-halogen fire-retardant resin composition containing ammonium polyphosphate and a resin component selected from the group consisting of polyamide-series, polyamide elastomer-series, and polyester elastomer-series thermoplastic resins. The coating layer of the preferred embodiments is formed with a non-halogen resin and a fire retardant other than metal hydroxide

The optical cord of the preferred embodiments has excellent fire-retardant properties using the non-halogen fire-retardant composition, as presently claimed. Furthermore, the cord has a bending rigidity with results in an excellent handling property, even though the diameter of the cord is 1.2mm or less.

As described by the Examiner, both Nakajima references teach a fiber optical cord having a diameter less than 1.2mm, but do not teach the non-halogen fire retardant resin, while Konaka teaches a non-halogen flame-retardant resin for a fiber optic cable.

In the background of the specification, the problems with using a non-halogen fire retardant resin are described. In particular, the problems with the bending rigidity were resolved by adjusting the specific compositions of the layers. As described with reference to Tables 1-2, controlling the composition of the ammonium polyphosphate and/or the melamine cyanurate produces fiber optic cables having the desired characteristics.

The cited references do not describe the difficulty of optimizing bending rigidity when minimizing the diameter of an optical fiber cord having a non-halogen fire retardant resin. These references also don't describe controlling the compositions of the fire retardant layer to produce a fiber optic cable having adequate bending rigidity, while having a diameter less than 1.2mm.

Although the von Bonin reference cited by the Examiner discloses a variety of fire resistant materials, no guidance at all is provided as to which materials or amounts would be suitable for a small diameter fiber optic cable. Accordingly, it is not obvious to use the specific claimed materials as the non-halogen fire resistant coating.

Applicant respectfully disagrees with the characterization of the limitations as being obvious to adjust the ranges. In particular, it has been established that it is inappropriate to make a rejection based on optimum or workable ranges, where the prior art does not teach or suggest that the variables being optimized will be expected to produce a desirable result. Thus, the prior art must first identify the result which optimizing the variable achieves. Applicants submit the cited art does not teach or suggest the desirable affect of providing the combination of ingredients in the claimed ranges.

Furthermore, von Bonin, at Col. 1, lines 10-13, only mentions melamine derivatives and phosphorus compounds as being conventional additives for known fire protectants. Von Bonin describes using aluminum hydroxide and calcium borate.

Von Bonin, at col. 2, lines 26-68, in particular lines 41-68, mentions polyester resins and polyamide resins as examples of binder materials. However, it never suggests that these resins are particularly preferable among the various compounds mentioned. Therefore, there is no guidance for selecting in particular, a polyester resin or a polyamide resin among the various compounds. Further, at lines 36-40, von Bonin describes that protectant is used as a pouring in

which cables or cable strands lie, and does not teach or suggest using the protectant as a sheath of a cable.

Furthermore, contrary to the Examiner's assertion, ammonium phosphate and melamine do not have the effect of extinguishing water. Extinguishing water generally occurs when water is generated as a result of a decomposition reaction of a metal hydroxide such as aluminum hydroxide under a high temperature environment, or when water of crystallization of a calcium borate is released during a decomposition reaction.

The examiner asserts that von Bonin also teaches using an appropriate amount of ammonium polyphosphate. However, Example 9 of the von Bonin reference only used 30 parts by weight of ammonium polyphosphate when preparing the composition in Example 7. Accordingly, the composition in Example 9 contained 50 parts of aluminum hydroxide, 50 parts of colemanite ($Ca_2B_6O_{11.5}H_2O$), 20 parts of aromatic isocryanate, and 30 parts of ammonium polyphosphate.

In contrast, the preferred embodiments of the present invention are directed to a composition in which 18-60 parts by mass of ammonium polyphosphate is blended with 100 parts by mass of a resin component containing at least one selected from the group consisting of polyamide-series thermoplastic resins, polyamide elastomer-series thermoplastic resins and polyester elastomer-series thermoplastic resins, as recited in Claim 1.

von Bonin does not teach or suggest a melamine resin or its amount in a fire retardant composition. von Bonin only states that the composition can include appropriate binders and appropriate auxiliaries in addition to aluminum hydroxide and calcium borate. Furthermore, von Bonin states the resulting mixture can be chemically and/or physically altered by hardening, polymerization, or removal of water or solvents. In contrast, the nitrogen-containing compounds of the preferred embodiments, such as melamine, do not cause chemical and/or physical interaction with the other components when it is included in a coating composition.

Accordingly, Applicant maintains Claims 1 and 4 are patentable over Nakajima, Konaka and von Bonin. As Claim 3 is dependent on independent Claim 1, and Claims 5-8 are dependent on Claim 4, they are patentable for at least these reasons.

New Claim

As indicated above, Applicant has added new Claim 9. Support for this claim is found in the specification. Applicant submits that this new claim also includes a unique combination of features not taught or suggested by the prior art. Thus, Applicant respectfully submits that this claim is in condition for allowance, and such action is respectfully requested.

CONCLUSION

The applicant has endeavored to address all of the Examiner's concerns as expressed in the outstanding Office Action. Accordingly, amendments to the claims pursuant to statutory sections 103 and/or 112, the reasons therefor, and arguments in support of the patentability of the pending claim set are presented above. In light of these amendments and remarks, reconsideration and withdrawal of the outstanding rejections is respectfully requested.

Any claim amendments which are not specifically discussed in the above remarks are not made for patentability purposes, do not narrow the claims, and it is believed that the claims would satisfy the statutory requirements for patentability without the entry of such amendments. Rather, these amendments have only been made to increase claim readability, to improve grammar, and to reduce the time and effort required of those in the art to clearly understand the scope of the claim language. Furthermore, any new claims presented above are of course intended to avoid the prior art, but are not intended as replacements or substitutes of any cancelled claims. They are simply additional specific statements of inventive concepts described in the application as originally filed.

If the Examiner has any questions which may be answered by telephone, he is invited to call the undersigned directly.

Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP

Dated: 11/26/02

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE ABSTRACT:

The abstract has been amended as follows:

~~An optical fiber cord which is~~ A single core optical fiber cord ~~(1)~~ having an outer diameter of 1.2mm or less, and having ~~has~~ a structure in which an optical fiber core wire ~~(2)~~ having a resin coating provided at the center, a tensile-strength-fiber layer ~~(3)~~ around the ~~outer~~ periphery of the optical fiber core wire, and a coating layer ~~(4)~~ around the outer periphery of the tensile-strength-fiber layer is provided. ~~, wherein~~ The coating layer can be is composed of a non-halogen fire-retardant resin ~~is disclosed~~. Although the outer diameter thereof is 1.2mm or less, the ~~this~~ optical fiber cord preferably has excellent fire retardant, mechanical and handling properties, ~~although the outer diameter thereof is made smaller so as to be than 1.2mm or less~~.

IN THE CLAIMS:

Claims 1 and 3-4 have been amended as follows:

1. An optical fiber cord which is a single core optical fiber cord having an outer diameter of 1.2mm or less, and has a structure in which an optical fiber core wire having a resin coating is provided at the center, a tensile-strength-fiber layer is provided around the outer periphery of the optical fiber core wire, and a coating layer is further provided around the outer periphery of the tensile-strength-fiber layer,

wherein the coating layer is composed of a non-halogen fire-retardant resin, and

wherein the coating layer is formed by a composition in which 18-60 parts by mass of ammonium polyphosphate is blended with 100 parts by mass of a resin component containing at least one selected from the group consisting of polyamide-series thermoplastic resins, polyamide elastomer-series thermoplastic resins and polyester elastomer-series thermoplastic resins.

3. The optical fiber cord as claimed in Claim ~~2~~ 1, wherein the ammonium polyphosphate is one that has been surface-treated.

4. An optical fiber cord which is a single core optical fiber cord having an outer diameter of 1.2mm or less, and has a structure in which an optical fiber core wire having a resin coating is provided at the center, a tensile-strength-fiber layer is provided around the outer

periphery of the optical fiber core wire, and a coating layer is further provided around the outer periphery of the tensile-strength-fiber layer,

wherein the coating layer is composed of a non-halogen fire-retardant resin, and

~~The optical fiber cord as claimed in Claim 1,~~ wherein the coating layer is formed by a composition in which 18-60 parts by mass of a fire retardant, which consists of ammonium polyphosphate and a nitrogen-containing compound, is blended with 100 parts by mass of a resin component containing at least one selected from the group consisting of polyamide-series thermoplastic resins, polyamide elastomer-series thermoplastic resins and polyester elastomer-series thermoplastic resins.

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